

OIL BURNER.

1,296,822.

FIG. 1.

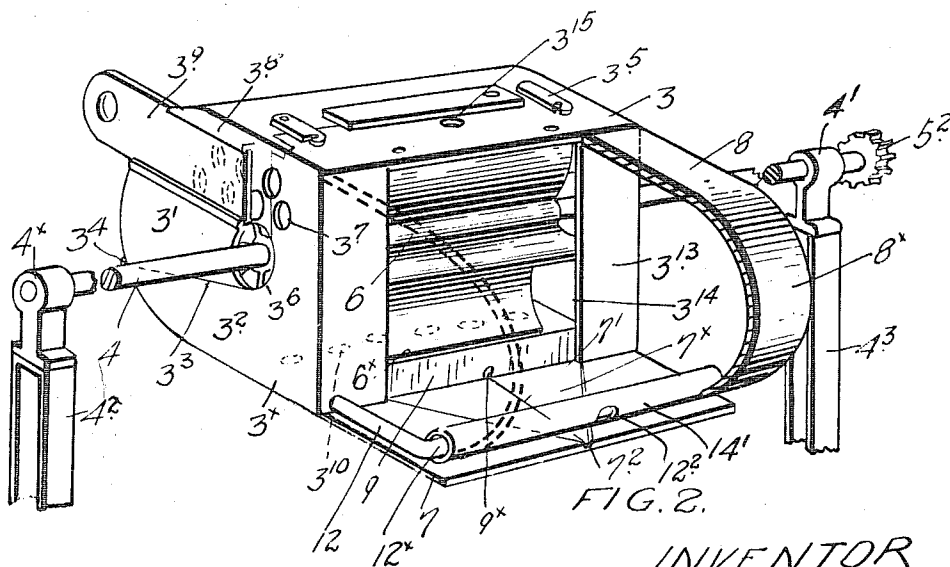


FIG. 2.

INVENTOR
WILLIAM H. LEGG.

by Whitcomb & Nichols

UNITED STATES PATENT OFFICE.

WILLIAM HENRY LEGG, OF TORONTO, ONTARIO, CANADA.

OIL-BURNER.

1,296,822.

Specification of Letters Patent.

Patented Mar. 11, 1919.

Application filed May 10, 1918. Serial No. 233,738.

To all whom it may concern:

Be it known that I, WILLIAM HENRY LEGG, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Oil-Burners, of which the following is the specification.

My invention relates to improvements in oil burners, and the object of the invention is to devise a burner in which there will be no carbonization of pipes, in which there will be an increased forced draft producing an increased fire, in which the consumption of oil will be automatically regulated thereby economizing such consumption, and in which there will be no wastage of oil and it consists essentially of the following arrangement and construction of parts as hereinafter more particularly explained.

Figure 1, is a sectional view through a portion of a furnace showing my burner in position and means for regulating the same.

Fig. 2, is a perspective view of my burner.

Fig. 3, is an enlarged sectional detail of the oil feed.

In the drawings like characters of reference indicate corresponding parts in the various figures.

1 indicates a portion of a furnace, 1^x being the furnace door opening and 1' the ash pit door opening. 3 indicates my burner which comprises a casing 3^x, the front portion being substantially rectangular in form and the rear or outer portion being semi-cylindrical. The rear portion is preferably formed in two parts 3' and 3² divided on a line 3³, the portions 3' and 3² being hinged together at 3⁴. The free end of the divided portion 3' is connected to the stationary portion by suitable swinging catches 3⁵. 3⁶ indicate circular openings formed in the end walls of the casing. 3⁷ indicate a series of perforations formed in the upper outer portion of the casing through which air is supplied to the interior. 3⁸ indicates a guideway in which is held a slide plate 3⁹ adapted to close one or more of the openings 3⁷ so as to regulate the amount of air supplied. 3¹⁰ indicates a series of orifices formed in the bottom of the casing and adapted to supply cold air into the bottom so as to prevent the heat of the flame passing around to the outer portion of the casing.

The size of the openings 3¹⁰ is also regulated by a slide plate 3¹¹ held in guideways similar to the guideways 3⁸.

The casing 3 is of such a size as to fit snugly within the fire door opening 1^x of the furnace. The front wall 3¹³ is provided with an opening 3¹⁴ facing into the interior of the furnace.

4 indicates a shaft mounted on bearings 4^x and 4' carried by standards 4² and 4³ located at the outside of the furnace. 4⁴ indicates a frame which is preferably connected to the standard 4³ and on which is mounted a motor 5. 5^x indicates the motor shaft, 5' a worm mounted upon the motor shaft and 5² a worm gear mounted upon the shaft 4 and with which the worm 5' engages and whereby the shaft 4 is rotated.

6 indicates a fan which is secured to the shaft 4, the fan revolving in the direction indicated by arrow (see Fig. 1). The blades 6^x of the fan 6 preferably curve backward as indicated. 7 indicates a shelf which is formed by an extension of the bottom wall of the casing 3, the center portion of the shelf being provided with a V-shaped depression 7^x, such depression inclining from each side toward the central line 7' leading to the dripping orifice 7². The sides of the V-shaped depression extend from each side of the opening 3¹⁴. 8 indicates a shield which is secured as indicated in Fig. 1 to the upper wall of the casing 3. The shield 8 extends horizontally forward and curves down at 8^x in semi-circular form, the lower edge of such curved portion approaching into close proximity with the lower edge of the shelf 7.

9 indicates an upwardly extending cross rib extending across the bottom of the opening 3¹⁴. The rib 9 is substantially triangular in cross section, the outer face being curved concentrically to the center of the shaft 4. The bottom of the casing 3 inclines downwardly slightly toward such cross rib, the center of the rib being provided with an orifice 9^x through which any oil which gathers upon the bottom of the casing flows into the depression 7^x so as to pass the dripping orifice 7².

10 indicates a pan which is located beneath the shelf 7 and is designed to receive the oil dripping therefrom. The pan 10 is supported upon a discharge pipe 11 provided with a head 11^x having perforations 11' through which the oil passes from the pan 10 into the pipe 11, the pipe 11 passing downwardly and outwardly through the ash pit door opening 1' to a suitable receptacle

from which oil may be returned to the source of supply.

12 indicates a gas pilot pipe which is provided with a right angular extension 12^x extending across the shelf 7 and suitably perforated. 14' indicates an air pipe surrounding the perforated portion 12^x of the pipe 12 and provided with a flame orifice 12². The flame from the orifice 12² is projected against the curved portion 8^x of the shield 8 passing upwardly around such curved portion as indicated in Fig. 1 of the drawings. 13 indicates an oil supply pipe provided with a downward feed extension 13^x. 14 indicates an air supply pipe which extends from a hood 14^x which is carried suitably and freely over the top of the furnace. The air pipe is provided with an enlargement 13². The pipe 13 extends into the pipe 14 above its enlargement 13², the portion 13^x depending in the enlargement clear of the sides thereof. The lower portion of the enlargement is provided with a comparatively large orifice 13³. As the oil passes through the pipe 13 and down through the pipe 13^x it drops through the enlargement 13² and orifice 13³. Cool air is drawn beneath the hood 14^x and is warmed by the furnace, the warm air passing through the pipe 14 into the enlargement mixing with the oil as it is atomized, the atomized oil passing through the opening 13³ into the burner casing 3^x and on to the fan 6, the blades of which further break up the oil forming it into a fine vapor.

15 indicates a valve located in the pipe 13 controlled by the valve handle 15^x. 16 indicates a solenoid provided with a core 16^x. 16' indicates a contact plate carried by the core and 16² indicates a stem extending from such plate and pivotally connected at its outer end to the valve handle 15^x.

16³ indicates a stationary abutment. 16⁴ indicates a collar carried by the stem 16². 16⁵ indicates a compression spring located between the collar 16⁴ and the abutment 16³.

17 and 18 indicate two stationary contact pieces forming the terminals for the wires 17^x. The wires 17^x and 18^x lead to the motor terminals 5² and 5³. 19 indicates a thermostat which is of a type commonly used and which may be regulated to operate at any desired temperature. The thermostat 19 is provided with a stem 19^x carrying a contact plate 19'. 19² and 19³ indicate stationary contacts co-acting with the plate 19' and from which wires 19⁴ and 19⁵ extend to the windings of the solenoid 16 forming a circuit supplied by a suitable source of power 19⁶.

The valve arm 15^x in the position shown in the drawing is in the closed position or the position it would assume when the temperature of the furnace has been raised to a maximum. If the temperature of the fur-

nace decreases below a certain point the contact plate 19' is carried into engagement with the plates 19² and 19³ thereby closing the circuit through the solenoid 16. By this means the contact plate 16' is carried into engagement with the contacts 17 and 18 closing the circuit of the motor 5 so as to operate the same. Simultaneously the stem 16² is drawn in a corresponding direction thereby carrying the valve handle 15^x to the open position allowing oil to feed through the pipe 13. The oil passing through the pipe 13 on to the plate 14' is atomized and combined with air. This mixture impinges upon the blades of the revolving fan 6 which breaks the atomized oil up into a fine vapor, throwing such vapor against the super-heated curved portion 8^x of the plate shield 8 thereby igniting and producing a flame which passes through the opening formed at the ends of the shield into the furnace.

The cross rib 9 prevents the flame being carried forward into the outer portion of the casing 3, the orifices 3¹⁰ also preventing the heat effecting the outer portion of such casing.

When the temperature reaches its maximum the contact plate 19' drops out of engagement with the contacts 19² and 19³ thereby breaking the solenoid circuit allowing the solenoid core 16^x to return to its normal position by means of the compression spring 16⁵ thereby breaking the motor circuit formed by the wires 17^x and 18^x and simultaneously closing the oil supply valve 15.

From this description it will be seen that I have devised a very simple form of oil burner which will thoroughly atomize and then vaporize the oil, which will automatically cut off the oil supply at any predetermined temperature and thereby economize its consumption, which by the thorough mixing of the atomized oil with warm air and its complete atomization by the revolving fan prevents the carbonizing of the oil and in which I have provided a burner in which there are no pipes which could be affected by carbonization and in which any waste oil liable to collect in the burner is carried off so that it can be again utilized.

What I claim as my invention is:

1. An oil burner comprising a casing adapted to fit in the fire door opening of a furnace, means located within the casing for vaporizing the oil, a pilot light for igniting the vaporized oil, and means for automatically regulating the supply of oil by the temperature attained by the furnace.

2. An oil burner comprising a casing adapted to fit the fire door opening of a furnace, and having a front opening, a revolving fan mounted within the casing, means for feeding oil on to the blades of the revolving fan, a motor, driving connection be-

tween the motor and the fan, a solenoid and solenoid core, a contact plate carried by the core, stationary co-acting contacts, circuit wires connecting the stationary contacts, a thermostat, an electrical circuit connected to the windings of the solenoid, and means operated by the thermostat for closing such circuit.

3. An oil burner comprising a casing adapted to fit the fire door opening of a furnace and having a front opening, a revolving fan mounted within the casing, means for feeding oil on to the blades of the revolving fan, a motor, driving connection between the motor and the fan, a solenoid and solenoid core, an oil supply valve located in the oil supply pipe, a resiliently held rod connecting the handle of the valve to the solenoid core, a thermostat, an electric circuit connected to the windings of the solenoid, and means operated by the thermostat for opening and closing such circuit.

4. In a device of the class described, a casing adapted to fit the fire door opening of a furnace and having an opening in its inner wall, a fan revolvably mounted within the casing, an oil supply pipe adapted to feed oil on to the blades of the fan whereby the oil is vaporized and projected through the opening of the casing wall, and a curved plate carried by such casing against which the oil is projected, and a pilot light for heating such plate.

5. In a device of the class described, a casing having an opening in the front wall thereof, a fan revolvably mounted within the casing, means for feeding oil on to the blades of the fan whereby such oil is vaporized, a plate located in front of the casing opening against which the vaporized oil is projected, a pilot light for heating such plate, a shelf extending forwardly and forming an extension of the lower wall of the casing and provided with a tapered portion leading to a discharge spout in the inner edge of the

shelf, a drip pan located beneath the shelf, and a waste pipe leading from such fan to a suitable receptacle.

6. In a device of the class described, an oil feed pipe, an air supply pipe into which the oil feed pipe enters, a fan located above the outlet end of the pipe on to which the oil drops, and a hood extending over the furnace and free thereof and from which the air pipe leads.

7. In a device of the class described, a casing having air orifices in the end walls thereof and a front discharge, means for circulating the supply of air passing through such end orifices, a fan revolvably mounted within the casing, means for feeding atomized oil by gravity on to the blades of the fan, a plate located in front of the discharge opening against which the oil is brought, and means for heating such plate.

8. In a device of the class described, a casing having air orifices in the end walls thereof and a front discharge opening and air orifices in the bottom wall thereof, means for circulating the supply of air passing through such end orifices and bottom orifices, a fan revolvably mounted within the casing above such bottom orifices, means for supplying oil by gravity on to the blades of the fan, a plate located in front of the discharge opening against which the oil is projected, and means for heating such plate.

9. An oil burner comprising a casing adapted to fit the fire door orifice of a furnace, means for feeding and atomizing the oil and mixing warm air therewith as it passes into the casing, means for vaporizing the mixture within the casing, and a superheated plate against which the mixture is projected.

WILLIAM HENRY LEGG.

Witnesses:

M. EGAN,
R. MOFFAT.